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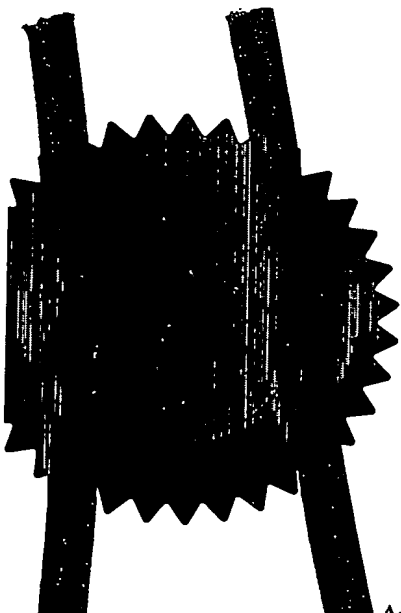
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Dated 12 January 2004



29 JAN 2003

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The Patent Office

Cardiff Road  
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1. Your reference CDK2085

2. Patent application number 0301975.9  
(The Patent Office will fill in this part)  
29JAN03 F780621-6 D02806  
P01/7700 0.00-0301975.9

3. Full name, address and postcode of the or of each applicant (underline all surnames)  
RHODIA CONSUMER SPECIALTIES LIMITED  
Oak House  
Reeds Crescent  
Watford  
Hertfordshire, WD24 4QP.

Patents ADP number (if you know it) 7870322006

If the applicant is a corporate body, give the country/state of its incorporation England

4. Title of the invention TREATING SLURRIES

5. Name of your agent (if you have one) Barker Brettell  
"Address for service" in the United Kingdom to which all correspondence should be sent (including the postcode)  
138 Hagley Road  
Edgbaston  
Birmingham  
B16 9PW

Patents ADP number (if you know it) 7442494002 ✓

6. If you are declaring priority from one or more earlier patent applications, give the country and the date of filing of the or of each of these earlier applications and (if you know it) the or each application number	Country	Priority application number (if you know it)	Date of Filing (day/month/year)
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7. If this application is divided or otherwise derived from an earlier UK application, give the number and the filing date of the earlier application	Number of earlier application	Date of filing (day/month/year)
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8. Is a statement of inventorship and of right to grant of a patent required in support of this request (Answer 'Yes' if:  
a) any applicant named in part 3 is not an inventor, or  
b) there is an inventor who is not named as an applicant, or  
c) any named applicant is a corporate body.  
See note (d)) YES

# Patents Form 1/77

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Continuation sheets of this form -

Description 5 + 5

Claim(s) 3 + 3

Abstract -

Drawing(s) -

10. If you are also filing any of the following, state how many against each item.

Priority documents -

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Statement of inventorship and right to grant of a patent (*Patents Form 7/77*) -

Request for preliminary examination 1  
(*Patents Form 9/77*)

Request for substantive examination -  
(*Patents Form 10/77*)

Any other documents -  
(*please specify*)

11. I/We request the grant of a patent on the basis of this application.

Signature  
*Barker Brettell*  
Barker Brettell

Date  
28 January 2003

12. Name and daytime telephone number of person to contact in the United Kingdom  
Colin D. Kinton  
Tel: 0121 456 1364

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# TREATING SLURRIES

This invention relates to a composition for treating inorganic slurries and to a method of treating inorganic slurries with the aforesaid composition  
5 so as to maintain the slurries in a substantially homogeneous phase.

The present invention will be described herein with particular reference to calcium carbonate-based slurries, especially those used in paper-making processes, although it is not to be construed as being limited thereto.  
10

Most inorganic slurries contain about 70% to 80% by weight of solids. Many inorganic slurries (particularly those based on calcium carbonate) are known to be susceptible to bacterial contamination and it has been the practice to add one or more biocidally-active materials to the slurries in  
15 order to minimise such contamination.

Phosphorus-containing compounds, in particular tetrakis(hydroxyorgano)phosphonium salts (THP<sup>+</sup> salts) are known to be effective biocides. Experimental work carried out by the applicants has  
20 shown, for example, that the addition of a solution of tetrakis(hydroxymethyl)phosphonium sulphate (THPS) to a calcium carbonate-based slurry can give rise to a reduction in bacterial count of 10<sup>4</sup> in 2 hours.

25 However, it is also known that addition of THPS alone to a slurry results in instantaneous heterogeneous thickening and aggregation of the slurry.

The applicants have found that the use of a composition comprising a THP<sup>+</sup> salt and a dispersant will provide continuing preservation against  
30 bacterial contamination, while at the same time maintaining the slurry in a substantially homogeneous phase.

Accordingly, in a first aspect, the present invention provides a composition for treating an inorganic slurry, the composition comprising:

5 (a) a tetrakis(hydroxyorgano)phosphonium salt (hereinafter THP<sup>+</sup> salt);

and

(b) a dispersant selected from the group consisting of:

10

(i) phosphonated compounds containing at least one tertiary nitrogen atom;

(ii) phosphonated oligomers of unsaturated acids;

15

(iii) homopolymers of unsaturated acids;

and (iv) polyphosphates.

20 In accordance with the present invention, the THP<sup>+</sup> salt is preferably tetrakis(hydroxymethyl)phosphonium sulphate.

Alternatively, the THP<sup>+</sup> salt may be tetrakis(hydroxymethyl)phosphonium chloride, phosphate, nitrate or oxalate.

25

A preferred example of a dispersant of the type (b)(i) is a compound having one tertiary nitrogen atom, such as a sodium salt of nitrilotris(methylene phosphate), particularly the tetra-sodium salt.

30 Preferred examples of dispersants of the type (b)(ii) include those oligomers having the general  $H(CH_2OM.CH_2OM)_nPO_3M_2$ , wherein M is a

cationic species such that the oligomer is soluble in water and  $n$  is a number greater than 1.

Other suitable oligomers are disclosed in the applicant's European Patent  
5 Specification 0 491 391.

A preferred example of a dispersant of the type (b)(iii) is a homopolymer of acrylic acid, especially a homopolymer having a molecular weight in the range 2000 to 5000.

10

Preferred examples of dispersants of the type b(iv) include sodium tripolyphosphate.

In a second aspect, the present invention provides a method of treating an  
15 inorganic slurry to maintain the slurry in a substantially homogeneous phase, the method comprising the addition to the slurry of an effective amount of a composition according to the first aspect of the present invention.

20 The inorganic slurry may, for example, comprise a calcium carbonate-based slurry.

Alternatively, the inorganic slurry may comprise a pigment slurry, a clay slurry or a cement slurry.

25

Preferably, the ratio of THP<sup>+</sup> salt to dispersant in the composition is about 2:1 (as active ingredients).

Suitably, the composition may be added to the slurry in an amount in the  
30 range 10ppm to 1000ppm (by weight of the slurry), for example about 750ppm (by weight of the slurry).

The present invention will be illustrated by way of the following examples.

- 5 In the examples, a 75% calcium carbonate slurry (commercially known as Setacarb) was treated with:

Example 1 : THP<sup>+</sup> salt alone.

- 10 Example 2 : THP<sup>+</sup> salt and dispersant of type (b)(i).

Example 3 : THP<sup>+</sup> salt and dispersant of type (b)(ii).

15 The amounts of each additive used, and the results, are given in the TABLE below.

TABLE

Example No.	THP <sup>+</sup> salt (ppm)	Dispersant (ppm)	Result
1	(a) THPS 750ppm	(b) (nil)	Instant heterogeneous thickening
25 2	(a) THPS 750ppm	b(i) 375ppm	No thickening
3	(a) THPS 750ppm	b(ii) 375ppm	No thickening

Notes to TABLE

- (a) An aqueous solution of tetrakis(hydroxymethyl)phosphonium sulphate (75% a.i.), available as TOLCIDE®-PS75.
- 5
- (b)(i) An aqueous solution of the tetra sodium salt of nitrilotris(methylene phosphonic acid), available as BRIQUEST® 301-32S.
- 10 (b)(ii) A homopolymer of polyacrylic acid, having a molecular weight in the range 2000-5000 and available as BEVALOID®211.



CLAIMS

1. A composition for treating an inorganic slurry, the composition comprising:

5

(a) a tetrakis(hydroxyorgano)phosphonium salt (herein THP<sup>+</sup> salt);

and

10 (b) a dispersant selected from the group consisting of:

(i) phosphonated compounds containing at least one tertiary nitrogen atom;

15 (ii) phosphonated oligomers of unsaturated acids;

(iii) homopolymers of unsaturated acids;

and (iv) polyphosphates.

20

2. A composition according to Claim 1, in which the THP<sup>+</sup> salt is tetrakis(hydroxymethyl)phosphonium sulphate.

3. A composition according to Claim 1, in which the THP<sup>+</sup> salt is  
25 tetrakis(hydroxymethyl)phosphonium chloride, phosphate, nitrate or oxalate.

4. A composition according to any one of Claims 1 to 3, in which the  
dispersant (b(i)) is a phosphonated compound containing one tertiary  
30 nitrogen atom.

5. A composition according to Claim 4, in which the dispersant (b(i)) is a sodium salt of nitrilo-tris(methylene phosphonate).
6. A composition according to Claim 5, in which the salt is the tetra-  
5 sodium salt.
7. A composition according to any one of Claims 1 to 3, in which the dispersant (b(ii)) is a phosphonated oligomer of maleic acid.
- 10 8. A composition according to Claim 7, in which the oligomer has the general formula  $H(CH_2OM.CH_2OM)_n PO_3M_2$ , wherein M is a cationic species such that the oligomer is soluble in water and n is a number greater than 1.
- 15 9. A composition according to any one of Claims 1 to 3, in which the dispersant (b(iii)) is a homopolymer of acrylic acid.
10. A composition according to Claim 9, in which the homopolymer has a molecular weight in the range 2000 to 5000.
- 20 11. A composition according to any one of Claims 1 to 3, in which the dispersant (b(iv)) is sodium tripolyphosphate.
12. A method of treating an inorganic slurry to maintain the slurry in a  
25 substantially homogeneous phase, the method comprising the addition to the slurry of an effective amount of a composition according to any one of Claims 1 to 11.
13. A method according to Claim 12, in which the ratio of THP<sup>+</sup> salt  
30 to dispersant in the composition is about 2:1 (as active ingredients).

14. A method according to Claim 12 or 13, in which the composition is added to the slurry in an amount in the range 10ppm to 1000ppm (by weight of the slurry).
- 5 15. A method according to Claim 14, in which the composition is added to the slurry in an amount of about 750ppm (by weight of the slurry).
- 10 16. A method according to any one of Claims 12 to 15, in which the slurry comprises a calcium carbonate-based slurry.
17. A method according to any one of Claims 12 to 15, in which the slurry comprises a pigment slurry, a clay slurry or a cement slurry.
- 15 18. A method of treating an inorganic slurry, substantially as hereinbefore described with reference to the Examples.

PCT Application  
**PCT/GB2004/000056**

